

2. Additional Observations on the Anatomy of the Spotted Hyæna. By M. WATSON, M.D., F.Z.S., Professor of Anatomy, the Owens College, Manchester.

[Received March 21, 1881.]

(Plate XLIX.)

On former occasions I have laid before this Society the results of observations on the anatomy of the male¹ and female² organs of *Hyæna crocuta*; and having, through the kindness of Mr. Sclater, had an opportunity of again submitting to anatomical examination the carcasses of two additional specimens of this remarkable animal which died in the menagerie of the Society during last summer, I desire to record some supplementary observations made at that time. The specimens referred to were both full-grown and of large size. One was a female, which had on several occasions given birth to young while in the Society's collection, whilst the other was a male. An examination of the genital organs of this female whilst perfectly fresh, served to explain several difficulties to which I drew attention in my previous communication with regard to the alteration which these organs undergo during the process of parturition. The organs which I formerly described being those of a virgin, I now lay before the Society the results of a comparative examination of these with the organs of a mature female.

Female.

With respect to the form and arrangement of the ovaries, Fallopian tubes, and uterus, I have nothing to add to what has already been stated in the paper referred to, beyond the fact that on slitting open the body of the uterus, I could distinguish about the middle in length of that organ two *very slightly* projecting folds of mucous membrane, which I failed to recognize in my first specimen, and which ought possibly to be regarded as indicating the position of the os uteri. If this view be correct, then the lower half of the corpus uteri of my former paper must be regarded as the morphological equivalent of the vagina. At the same time the very small size of these folds, the absence of any structural difference in character of the mucous membrane lining the two portions of the canal, and the similarity in thickness of the muscular coat of both throw doubt upon this interpretation—a doubt which can only be satisfactorily dispelled by an examination of the parts in a pregnant female, and the consequent determination of the position of the young *in utero*.

In the second female dissected the urinogenital canal differed much in several particulars from that of the virgin. In the latter the extremity of the clitoris is perforated by “a single canal of so small a size, that one is at first sight inclined to believe that

¹ P. Z. S. 1878, p. 416.

² P. Z. S. 1877, p. 369.

he is dealing with the extremity of the male urethra, an error only corrected by an examination of the internal organs"¹. This orifice, I showed, is situated on the *extremity* of the well-defined glans clitoridis, that portion of the glans which is placed *above* the opening in question being formed by the spongy structure of the corpora cavernosa clitoridis, whilst the extremity of the glans *below* the orifice is formed by the walls of the urinogenital canal itself. The glans clitoridis of the virgin is moreover surrounded by a well-defined prepuce. In the paper referred to, whilst directing attention to the small diameter of the urinogenital canal of the virgin *Hyæna crocuta*, I referred to the difficulty of explaining the passage of the young through so narrow a channel. An examination of the organs of the female which had borne young served to explain this difficulty, and showed that the external organs, including the urinogenital canal, undergo considerable alteration subsequent to parturition. These changes refer exclusively to the urinogenital canal, and more especially to the orifice of the latter, the internal organs of generation undergoing no alteration in form.

With regard to the alteration in size of the urinogenital canal, I found that whilst in the virgin that canal does not exceed half an inch in diameter at any part, and that its orifice at the extremity of the clitoris is not larger than to enable an ordinary knitting-pin to be inserted, in the female which had borne young, on the other hand, the canal becomes dilated to such an extent as readily to admit of the insertion of three fingers into the orifice, and of their passage backward through its entire length. The orifice of the urinogenital canal, together with the extremity of the clitoris, moreover undergoes considerable alteration. In the virgin the orifice of the canal is situated on the *extremity* of the clitoris, much as in the opposite sex; whilst in the female which has borne young the lower portion of the glans clitoridis, which in the virgin is formed by the lower wall of the urinogenital canal itself, entirely disappears, and consequently the canal, instead of opening upon the *extremity* of the glans clitoridis as in the virgin, opens altogether *below* that body (compare figs. 1, 2, 3, Plate XLIX.). Owing to this change in the relation of parts, the lower wall of the orifice of the urinogenital canal in the female which has borne young is formed, not by the lower portion of the glans clitoridis, but by the lower segment of the prepuce, with which the lower half of the glans clitoridis of the virgin has apparently coalesced. In the virgin female, moreover, the glans clitoridis, together with the orifice of the urinogenital canal, is contained within a single chamber formed by the encircling prepuce, the latter being attached to the glans by a single mesially placed frænum. In the female which has borne young, on the other hand, the coalescence of the lower half of the glans clitoridis with the corresponding segment of the prepuce has, so to speak, occasioned a splitting of the frænum clitoridis into two lateral halves, each of which is attached by one extremity to the lateral aspect of the glans clitoridis, whilst its other extremity is fused with the

¹ P. Z. S. 1877, p. 369.

opposing surface of the prepuce. Consequent upon this alteration in the state of the parts, the originally *single* chamber bounded by the prepuce becomes divided into *two* compartments—an upper, which contains the glans clitoridis, and a lower, in which is situated the orifice of the urinogenital canal. It appears, therefore, that in the female which has borne young the frænum of the prepuce becomes, as it were, separated into two lateral halves, and that these, owing to the dilatation of the orifice of the urinogenital canal, are displaced upwards, so as to subdivide the preputial chamber into two parts, an upper and a lower (Plate XLIX. fig. 3). At the same time the lower wall of the extremity of the urinogenital canal becomes adherent to and coalescent with the lower segment of the prepuce. In the mature female *Hyæna crocuta* the arrangement of the parts which constitute the external genital organs is almost identical with that which characterizes the genus *Elephas*, an arrangement which, so far as our present knowledge goes, is confined among mammals to one species of *Hyæna* and to the two species of *Elephant*¹.

But not only does the orifice of the urinogenital canal, together with the extremity of the clitoris, undergo alteration in the female which has given birth to young as compared with the virgin; the entire perineal region undergoes a marked change in appearance. This change is due to the fact that in the former the perineal region becomes more flaccid and “baggy” in character. To this is attributable the fact that the “scrotal pouches” which I referred to in my previous paper as being prominent in the virgin, become less so in the female which has borne young; and consequently the resemblance which the external organs of the virgin female bear to those of the male becomes considerably modified subsequent to parturition. In the mature female, moreover, the glans clitoridis, instead of projecting beyond the free margin of the prepuce as in the virgin, becomes concealed within the flaccid folds of the latter, which, by reason of the “baggy” condition of the entire perineal region, is not so clearly defined from the surrounding integument as it is in the virgin. That this concealment of the clitoris of the adult female, as compared with that of the virgin, is not due to any diminution in size of the organ itself in the former, is shown by the fact that, whilst in the virgin which I first examined the clitoris measured $6\frac{1}{2}$ inches in length, and the penis of the male which I formerly examined measured 8 inches in length, in the female which had borne young I found that the clitoris measured $6\frac{1}{2}$ inches in length, and the penis of the second and more mature male which I received from the Society’s Gardens measured 9 inches in length. The dimension of the clitoris in both specimens is the same, whilst the relative size of the male and female organs are nearly alike in both cases. The lesser prominence of the clitoris in the female which had borne young is therefore attributable to the greater flaccidity of the tegumental folds surrounding it, consequent on parturition, rather than to any diminution in size of the clitoris itself.

¹ Watson, “On the Female Organs of the Proboscidea,” Trans. Zool. Soc. vol. xi.

On the glans clitoridis of the virgin female which I formerly described, I failed to distinguish any trace of the recurved spines which beset the glans penis of the opposite sex. In the mature female, on the other hand, the glans clitoridis is invested by a number of minute spines, which, however, were neither so numerous nor of so horny a nature as the corresponding structures of the male organ. The presence of these spines in the mature female and their absence in the virgin appear to show that they are structures of comparatively late growth.

Nipples.—The nipples in the female which has produced young are four in number. Of these two are of small size and had apparently never been functionally active. They are situated one on either side of and almost in contact with the side of the prepuce. They are symmetrically placed near either side of the middle line, and are separated from one another by a distance of $1\frac{1}{2}$ inch. Of these two nipples, the right is smaller than the left. The other two nipples were of large size; and both had evidently given suck. Like the first pair, they are situated symmetrically on either side of the middle line, at a distance of $2\frac{1}{2}$ inches from the latter and 3 inches in front of the free border of the prepuce. Each measures $1\frac{1}{2}$ inch in length. In the second male which I examined I could only distinguish a single pair of rudimentary nipples. They were symmetrically disposed, one on either side of the free margin of the prepuce, but not in contact with the latter as in the mature female, but separated from the prepuce by a distance of 2 inches. It will be seen, therefore, that in the two sexes the nipples neither correspond in respect of number nor of position.

In my previous papers I showed that in the female the anal scent-glands much exceeded in size those of the male. Further observations on the size of these glands in the two specimens last examined show that the anal glands in both sexes are of the same size, and that they equal those of the virgin which I first dissected. Probably the difference in size of these glands in the two male specimens is explicable on the supposition that the specimen last examined had attained greater sexual maturity than the first, and that the anal glands, like certain of the sexual glands, only attain their full size some time after sexual maturity has been reached.

Male.

In a former communication¹ I directed attention to the difference between Prof. Flower's observations and my own with regard to the presence of a prostate gland in the male *Hyæna crocuta*. The examination of the male which I received last summer proved that a prostate gland is undoubtedly present in the male of this animal, as described by Professor Flower. Its form in the specimen referred to exactly agrees with the description which I formerly gave, founded upon an examination of the organs which Prof. Flower kindly placed at my disposal. The prostate (Plate XLIX. fig. 4) consists of two distinct masses, each measuring 1 inch in

¹ P. Z. S. 1878, p. 419, footnote.

length and half an inch in breadth, placed one on either side of the commencement of the urethra. The two lobes are, moreover, inseparably united by an intermediate isthmus, which extends across the upper wall of the urethra. The prostate gland of *H. crocuta* appears therefore to resemble closely that of *H. striata* as figured by Leuckart¹, but is more flattened from above downwards than in that animal. The absence, or apparent want of differentiation, of the prostate gland from the surrounding tissue in the first specimen which I examined of the male *H. crocuta*, taken in conjunction with its large size and clear differentiation in both the other specimens, each of which was known to be of great age, seems to show that this gland, like the anal scent-glands, only attains its full size at a period somewhat later than that at which the animal attains sexual maturity.

In addition to the careful investigation of the anatomy of the male and female generative organs, I made a particular examination of the other viscera of both the specimens forwarded to me by the Society. With regard to these, however, I noticed nothing of importance with which to supplement my previous description, beyond some few variations in respect of the number of pulmonic lobes in the different specimens. In the male previously described by Mr. Young and myself², the lung of the right side was subdivided into six lobes, whilst that of the left was subdivided into three. In the female, the anatomy of which forms a portion of the present communication, I found that the right lung was subdivided into *five* lobes, this being due to the fact that the fissure which separates lobes 1 and 3 of our first specimen did not exist, and that consequently these two lobes were fused to form a single one. The left lung of this specimen agreed exactly with the description previously given. In the second male which I examined I found that the anterior vertical fissure (previously described by us) in the left lung had likewise disappeared, so that the lobes 1 and 2 were almost completely fused. In the right lung of the same specimen there was a mere indication of the fissure which, in the joint paper referred to, separates lobes 1 and 2, whilst the fissure separating lobes 1 and 3 had completely disappeared. Consequently the lobes 1, 2, and 3, which in the specimen examined by Mr. Young and myself were perfectly distinct, were fused together and formed a single mass of pulmonary tissue. In this specimen, therefore, the right lung was subdivided into *four* lobes only, and not into six (as in the specimen described in our former paper).

Thus it would appear that the number of lobes into which the lung is divided varies in different specimens of the same species of *Hyæna*, and that consequently no weight can be placed on the number of pulmonic lobes in any attempt to define the specific characters of the various species of *Hyæna*.

I am indebted to the kindness of my friend Mr. Alfred Young for the drawings from nature which accompany this paper.

¹ Cyclopædia of Anatomy, art. VESICULA PROSTATICA

² P. Z. S. 1879, p. 87.

Fig 4

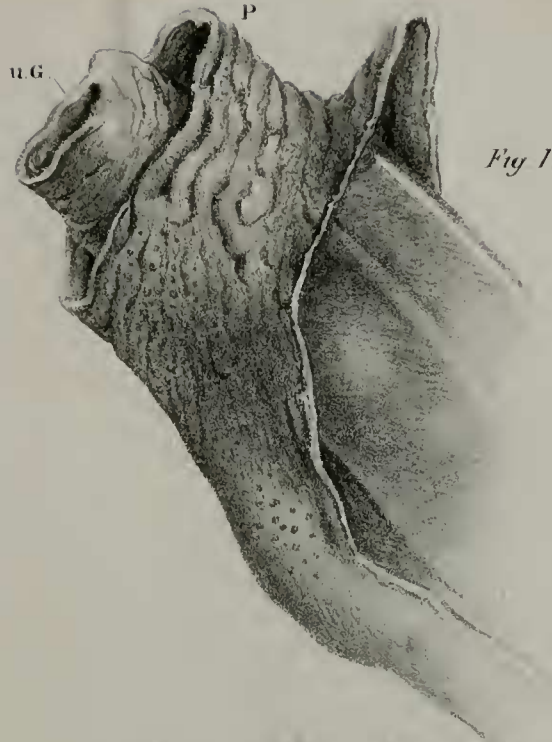
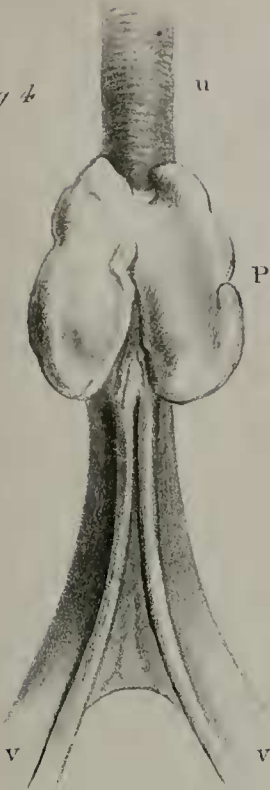


Fig 1

Fig 2



Fig 3



A H. Young del^d
J Smit lith

Hanhart imp